



# UNITED STATES PATENT AND TRADEMARK OFFICE

*lm*  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/809,646	03/16/2001	Shunpei Yamazaki	12732-021001 / US4802	5011
26171	7590	01/13/2004	EXAMINER	
FISH & RICHARDSON P.C. 1425 K STREET, N.W. 11TH FLOOR WASHINGTON, DC 20005-3500			DUONG, THOI V	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 01/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/809,646

Applicant(s)

YAMAZAKI ET AL.

Examiner

Thoi V Duong

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 and 23-35 is/are pending in the application.
- 4a) Of the above claim(s) 10,12,14,16-21,23-25,29 and 31-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9,11,13,15,26-28 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0602 & 1103 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. This office action is in response to the Amendment filed October 22, 2003.

Accordingly, claims 1-3, 11 and 15 were amended. Claims 10, 12, 14, 16-21, 23-25, 29 and 31-35 were previously withdrawn from consideration. Currently, claims 1-9, 11, 13, 15, 26-28 and 30 are pending in this application.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-9 and 26-28 stand rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki (USPN 6,365,917 B1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome

either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

With respect to claims 1-3, as shown in Figs. 3-5, Yamazaki discloses a liquid crystal display device comprising:

a semiconductor layer 102 formed on an insulating surface 103, said semiconductor layer having a channel forming region 114, an LDD region 115, 116 and source and drain regions 112 and 113;

a gate insulating film 103 formed on said semiconductor layer:

a first gate electrode 108 formed on said gate insulating film, said first gate electrode having a tapered shape in cross section at an edge portion;

a second gate electrode 107 formed on said first gate electrode,

wherein the width of said first gate electrode 108 in the longitudinal direction of said channel forming region is larger than that of said second gate electrode 107;

wherein said LDD region 115, 116 entirely overlaps with said first gate electrode 108 with said gate insulating film 103 interposed therebetween (Fig. 4B and col. 7, lines 38-42); and

wherein said channel forming region 114 overlaps with said second gate electrode 107 with said gate insulating film 103 interposed therebetween.

With respect to claims 4-9, Yamazaki discloses that the LDD region is formed in a self-aligning manner in accordance with the addition of an impurity element into said semiconductor layer with said second gate electrode as a mask (col. 16, lines 34-40),

wherein said LDD region contains a region having a concentration of said impurity element gradient in a range from at least  $1 \times 10^{10}$  to  $1 \times 10^{10}$  atoms/cm<sup>3</sup>, while increasing as the distance from said channel forming region increasing (col. 8, line 62 to col. 9, line 33).

Finally, with respect to claims 26-28, as intended use, Yamazaki discloses that the liquid crystal display device is incorporated into an electronic equipment selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal as shown in Figs. 11, 22 and 23 (col. 25 line 63 to col. 28, line 5).

***Claim Rejections - 35 USC § 103***

4. Claims 11, 13, 15 and 30 are rejected under 35 U.S.C. 103(a) as being obvious over Yamazaki (USPN 6,365,917 B1) in view of Yamazaki et al. (USPN 6,369,410 B1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and

reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

As shown in Fig. 19, Yamazaki discloses a liquid crystal display LCD) device comprising:

a pixel TFT 1702 (shown in Fig. 2C) and a driver circuit TFT 1901 (shown in Figs 10A-10F), each having a semiconductor layer 102 formed on an insulating surface 101, a gate insulating film 102 formed on said semiconductor layer a first gate electrode 108 formed on said gate insulating film, and a second gate electrode 107 formed on said first gate electrode 25 (Figs. 3 and 4);

wherein said semiconductor layer of said pixel TFT comprises (Figs. 3 and 4):

a channel forming region 114 overlapping with said second gate electrode with said gate insulating film interposed therebetween;

a first LDD region 115, 116 contacting said channel forming region and overlapping with said first gate electrode with said gate insulating film interposed therebetween;

a second LDD region 117, 118 contacting said first LDD region;

a source region 112 and a drain region 113 contacting said second LDD region,

wherein said first gate electrode has a tapered shape in cross section at an edge portion, and wherein the width of said first gate electrode in the longitudinal direction of the channel forming region is larger than that of said second gate electrode (Fig. 5).

With respect to claims 13 and 15, Yamazaki discloses that the LDD region is formed in a self-aligning manner in accordance with the addition of an impurity element into said semiconductor layer with said second gate electrode as a mask (col. 16, lines 34-40),

wherein said LDD region contains a region having a concentration of said impurity element gradient in a range from at least  $1 \times 10^{18}$  to  $1 \times 10^{20}$  atoms/cm<sup>3</sup>, while increasing as the distance from said channel forming region increasing (col. 8, line 62 to col. 9, line 33).

Finally, with respect to claim 30, as intended use, Yamazaki discloses that the liquid crystal display device is incorporated into an electronic equipment selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal as shown in Figs. 11, 22 and 23 (col. 25 line 63 to col. 28, line 5).

Yamazaki discloses a liquid crystal display device that is basically the same as that recited in claims 11, 13, 15 and 30 except for a semiconductor layer of the driver circuit TFT comprising a third LDD region contacting said channel forming region and entirely overlapping with said first gate electrode with said gate insulating film

interposed therebetween. As shown in Figs. 1A, 1B and 7, Yamazaki et al. discloses a semiconductor display device comprising:

- a first gate electrode 110, 112 formed on a gate insulating film 104;

- a second gate electrode 105, 111 formed on said first gate electrode;

- a channel forming region 107 overlapping with said second gate electrode with said gate insulating film interposed therebetween;

- a third LDD region 108 contacting said channel forming region and entirely overlapping with said first gate electrode with said gate insulating film interposed therebetween; and

- a source region and a drain region 109 contacting said third LDD region.

Yamazaki et al discloses that by an anodic oxidation process, part of the first gate electrode is transformed into an anodic oxidation layer 112 (col. 15, lines 14-20) so as to lower damage at ion implantation to the gate insulating film in the formation of the LDD region (see Abstract and col. 6, lines 46-54). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal display of Yamazaki with the teaching of Yamazaki et al. by forming a third LDD region contacting the channel forming region and entirely overlapping with said first gate electrode with said gate insulating film interposed therebetween so as to obtain a high reliability for the display and also, a high yield factor during manufacturing process (col. 53, lines 34-39).

### ***Respons to Arguments***



5. Applicant's arguments filed October, 22, 2003 have been fully considered but they are not persuasive.

With respect to claims 1-3, Applicant argued that Yamazaki shows a LDD region 22 that appears to partially overlap with a gate electrode 15 (as shown in Fig. 2A). The Examiner disagrees with Applicant's remarks because, as clearly shown in Figs. 4A-4C, the LDD region 115, 116 entirely overlaps with the first gate electrode 108. In addition, the Examiner did not refer to Fig. 2A in the last office action.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (703) 308-


Application/Control Number: 09/809,646

Page 9

Art Unit: 2871

3171. The examiner can normally be reached on Monday-Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (703) 305-3492.

  
ROBERT H. KIM  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

Thoi Duong

01/03/2004